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PROTECTION OF THE ATMOSPHERE: CLIMATE CHANGE

Synthesis Report on Ongoing Processes and Recommendations

Report of the Secretary-General of the Conference

I. INTRODUCTION

1. This paper was prepared to respond to decision 1/11 (a) of the First Session of the UNCED Preparatory Committee, requesting the "... Secretary-General ... to prepare a report that analysed and synthesized the results of those activities, and made recommendations thereon." and "... to prepare recommendations concerning the contribution of the Preparatory Committee to the negotiating process for a framework convention on climate change ...". 1/

1/ Report of the Preparatory Committee for the United Nations Conference on Environment and Development, Official Records of the General Assembly, A/45/46, decision 1/11, paragraphs (a) and (b).

2. Two main courses of events have been taking place in the United Nations system in response to the problem of climate change. Firstly, the First World Climate Conference and the World Climate Programme prepared the way for the recently held Second World Climate Conference (October/November 1990). Secondly, the creation of the Intergovernmental Panel on Climate Change (IPCC), which published its First Assessment in August 1990, has been a major milestone. These processes are referred to in more detail in the sections which follow.

3. In addition a number of other relevant processes are in place within the United Nations system, in particular in WMO, UNEP, FAO, UNESCO, IOC, UNDP and the World Bank, as well as outside it, such as, for example the International Geosphere-Biosphere Programme (IBGP) of the International Council of Scientific Unions, as well as intergovernmental and non-governmental organizations, such as the Organisation for Economic Co-operation and Development, the Latin American Energy Organization, the International Union for the Conservation of Nature, the Asian Energy Institute, the Stockholm Environment Institute, the World Resources Institute, Greenpeace International, just to name a few. Many of these have prepared inputs into the IPCC and the SWCC, and/or will be preparing inputs for the Negotiating Process on Climate Change and to the 1992 Conference.

4. The publication in 1987 of the report of the World Commission on Environment and Development, and the preparation by UNEP of the Environmental Perspective to the Year 2000 and beyond have firmly put the issue of climate change on the international political agenda.

5. The report which follows was prepared by the Secretary-General of the Conference with the help of a number of United Nations agencies, and other individual experts, who were members of the UNCED Working Party on Atmosphere. The First Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), and the reports of the Second World Climate Conference (SWCC) were particularly relied upon as inputs to this paper.

II. THE SECOND WORLD CLIMATE CONFERENCE (SWCC)

6. Planning for the Second World Climate Conference began in 1986. The Montreal Protocol on Substances that Deplete the Ozone Layer was a headline event in 1987. The following year was marked by the Toronto Conference on the Changing Atmosphere, and the creation of the Intergovernmental Panel on Climate Change (IPCC). In 1989, the Hague Declaration was signed by the Heads of State/Heads of Government of 25 countries. Later the same year 67 countries meeting in the Netherlands endorsed the Noordwijk Declaration on Climate Change.

7. In light of these developments the sponsoring agencies decided that the Second World Climate Conference should include a ministerial declaration in addition to the original scientific/technical component and should be delayed until late in 1990, when the publication of the IPCC First Assessment Report was expected.

8. The objectives and goals of the Conference were to create awareness, and to assess current state of knowledge on climate change and greenhouse gases, and the requirements for future scientific activity and the implications for public policy.

9. In terms of outputs, the Conference was expected to formulate recommendations for the continuing World Climate Programme, with a primary goal of ensuring that authoritative scientific information is continually obtained and provided to Governments; as well as to provide opportunity for the Ministers to consider follow-up actions, in an effort to identify elements that could form the basis for negotiations of the climate convention, needs of developing countries, and goals for enhancing intergovernmental co-operation.

10. By 1989, three international agencies had formally joined WMO as sponsors of the SWCC: the United Nations Environment Programme (UNEP), the United Nations Educational Scientific and Cultural Organization (UNESCO) and the International Council of Scientific Unions (ICSU). In 1990 the Intergovernmental Oceanographic Commission of UNESCO and the Food and Agriculture Organization joined.

III. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC)

11. The Tenth World Meteorological Congress (Geneva, 4-28 May 1987), recognizing that an interdisciplinary and multi-agency approach is necessary to understand the effects of increasing concentrations of greenhouse gases on the Earth's climate and on ways, particularly, in which these changes may impact socio-economic patterns and institutions, asked the Executive Council of the WMO "to arrange appropriate mechanisms for addressing the scientific and other aspects of the greenhouse gases". It further requested the Executive Council to keep under review:

(a) Existing international co-ordinating mechanisms for addressing scientific aspects of greenhouse gases;

(b) The progress of the World Climate Research Programme;

(d) The co-ordination of the World Climate Research Programme.

12. Responding to this directive, the Executive Council of WMO, at its thirty-ninth session (Geneva, 1-5 June 1987), had requested the Secretary-General of WMO, in co-ordination with the Executive Director of UNEP to establish an intergovernmental mechanism to carry out the intentions of the Tenth Congress.

13. In response to these actions, the Executive Director of UNEP and the Secretary-General of WMO decided that any intergovernmental mechanism should aim at providing the basis for the development of a realistic and effective internationally-accepted strategy for addressing climate change. They further

decided that the efforts in this regard should be channelled into two individual but interactive streams: one stream concentrating on assessments of available scientific information related to various aspects of climate change and the other on formulations of realistic response strategies for national and global action. To this end, it was decided to establish an Intergovernmental Panel on Climate Change (IPCC).

14. The WMO Executive Council suggested that the Panel should consider the need for:

- (a) Identification of uncertainties and gaps in our present knowledge with regard to climate change and its potential impacts, and preparation of a plan of action over the short term in filling these gaps;
- (b) Identification of information needed to evaluate policy implications of climate change and response strategies;
- (c) Review of current and planned national/international policies related to the greenhouse gas issues;
- (d) Scientific and environmental assessments of all aspects of the greenhouse gas issue and the transfer of these assessments and other relevant information to Governments and intergovernmental organizations to be taken into account in their policies on social and economic development and environmental programmes.

15. The Panel met for its first plenary session in Geneva on November 1988. At that time it elected its officers and established three Working Groups:

- (a) Working Group I to assess available scientific information on climate change;
- (b) Working Group II to assess the environmental and socio-economic impacts of climate change; and
- (c) Working Group III to formulate response strategies.

16. The IPCC also established a trust fund to assist experts from developing countries to attend the IPCC meetings and to cover the IPCC Secretariat expenses.

17. During its second plenary session (Nairobi, June 1989), IPCC established its Special Committee on the Participation of Developing Countries to promote, as quickly as possible, their full participation in IPCC activities. The number of developing countries participating in the IPCC meetings has increased noticeably from 11 in 1988 to 54 in 1990.

18. In accordance with the provisions of resolution 44/207 of the United Nations General Assembly and the respective decisions of the governing bodies of WMO and UNEP, the IPCC successfully completed its

First Assessment Report during its fourth plenary session (Sundsvall, Sweden, 27-31 August 1990). The Report is the first intergovernmental assessment of the climate change issue. Some 1,000 scientists and experts from over 70 countries contributed and the Report has undergone extensive peer reviews.

In 1,200-odd pages, the Report consists of:

The IPCC Overview;

The Policymakers Summaries of the three Working Groups;

The Policymakers Summary of the Special Committee; and

The full three reports of the Working Groups.

19. The Executive Council of WMO, and the Governing Council of UNEP have requested their respective executive heads to jointly arrange for the continuation of IPCC as a joint WMO and UNEP body to, inter alia:

(a) Undertake scientific and technical work in support of the negotiations of a framework convention on climate change;

(b) Periodically update the assessments on climate change;

(c) Undertake further environmental and socio-economic analyses of the policy options;

(d) Take all appropriate steps to ensure broad dissemination of its work;

(e) Evaluate the special problems of the developing countries;

(f) Ensure that its future work is supportive of and responds to the needs and requests of the climate convention negotiating group;

(g) Further pursue studies on the incremental costs to developing countries and small island States of combating climate change, as well as on the sources from which such costs may be met and on mechanisms for the channelling of these resources.

IV. SUMMARY OF THE MAIN ISSUES RELATED TO CLIMATE CHANGE

20. The Second World Climate Conference considered the report of the IPCC, as well as other information in the preparation of its own statement. A summary of the issues from the Scientific/Technical Conference Statement, and from the Ministerial Declaration which followed it is presented here:

A Summary of the Scientific/Technical Statement of the SWCC

21. Emissions resulting from human activities are substantially increasing atmospheric concentrations of the greenhouse gases. These will enhance the natural greenhouse effect, resulting on average in an additional warming of the Earth's surface. Without actions to reduce emissions, global warming is predicted to reach 2-5° C over the next century, a rate of change unprecedented in the past 10,000 years. The warming is expected to be accompanied by a sea-level rise of 65 cm $\pm$ 35 cm by the end of the next century. There remain considerable scientific uncertainties particularly with respect to the timing, magnitude and regional patterns of predicted climate change.

22. Climate change and sea-level rise would seriously threaten low-lying islands and coastal zones. Water resources, agriculture and agricultural trade, especially in arid and semi-arid regions, forests, and fisheries are especially vulnerable to climate change. Climate change may compound existing serious problems. In many cases the impact will be felt most severely in regions already under stress, mainly in developing countries.

23. Global warming induced by increased greenhouse gas concentrations is delayed by the oceans; hence, much of the change is still to come.

24. Although many of the response or feedback processes are poorly understood, it appears likely that, as climate changes, these feedbacks will lead to an overall increase rather than a decrease in greenhouse gas concentration.

25. Under "Business-as-Usual" (extrapolation of present trends) assumptions, it is projected that emissions will continue to grow in the future. As a result, the effect on the Earth's radiation balance corresponds to a doubling of the pre-industrial concentration of carbon dioxide by the year 2025, unless remedial actions are taken.

PER CAPITA CO₂ EMISSIONS FROM THE ENERGY SECTOR
(In tonnes of carbon per capita)

	1985	2000	2025
Industrialized Countries	3.12 (74%)	3.65 (68%)	4.65 (56%)
Developed Countries	0.36 (26%)	0.51 (32%)	0.84 (44%)
GLOBAL TOTAL	1.06 (100%)	1.22 (100%)	1.56 (100%)

Notes: The table is taken from the IPCC First Assessment Report, Working Group III. The figures do not include emissions other than carbon dioxide, or the effect of carbon sinks. The emissions are those from the IPCC Reference Scenario.

26. A clear scientific consensus has been reached on the range of changes to be expected. Although this range is large, it is prudent to exercise, as a precautionary measure, actions to manage the risk of undesirable climate change. In order to stabilize atmospheric carbon dioxide concentrations by the middle of the twenty-first century at about 40 per cent above pre-industrial concentrations, a continuous world-wide reduction of net carbon-dioxide emissions by 1 to 2 per cent per year starting now would be required. A 15-20 per cent reduction in methane emissions would stabilize atmospheric conditions of that gas.

27. Technically feasible and cost-effective opportunities exist to reduce CO₂ emissions in all countries. Such opportunities are sufficient to allow many industrialized countries to stabilize CO₂ emissions from the energy sector and to reduce these by at least 20 per cent by 2005. The measures include increasing the efficiency of energy use and employing alternative fuels and energy sources. In addition, reversing the current net losses in forests, by intensification of agricultural practices, as well as by reforestation would decrease present carbon emissions and also increase storage of carbon.

28. Present observational means for monitoring the climate system are inadequate for operational and research purposes. High priority must be placed on the provision and international exchange of data.

29. There is an urgent need to create a Global Climate Observing System (GCOS) built upon the World Weather Watch Global Observing System and the Integrated Global Ocean Service System and including both space-based and surface-based observing components.

30. The impacts of climate variability on human socio-economic systems have provided major constraints to development. Climate change may compound these constraints. Intensified efforts are required to refine further our ability to predict short-term climate variability, anticipate climate impacts, and identify rational strategies to mitigate or prevent adverse effect.

31. Among the most important impacts of climate change will be its effects on the hydrological cycle and water management systems, and through these, on socio-economic systems, such as, for example on food production patterns. Increases in incidence of extremes, such as floods and droughts would cause increased frequency and severity of disasters.

32. Important uncertainties remain regarding global food security. The potential impact on food production in developing countries, with more than half the world's population, could be more uncertain than recent reviews suggest.

33. High priority needs to be given to research on effects of rising CO₂ concentrations on crop productivity and to research on agricultural emissions, and to clarify the costs and possible trade-offs arising from limitation measures.

34. New or strengthened institutional mechanisms are required to upgrade natural resource inventories, research strategies and extension services to raise forest and agricultural productivity and minimize emissions.

35. In order to stabilize atmospheric concentrations of greenhouse gases while allowing for growth in emissions from developing countries, industrialized countries must implement reductions even greater than those required, on average, for the globe as a whole.

36. The direct impact of climate change on people, their health and cultural heritage, could be severe. There is likely to be increased health inequity between peoples of developing and developed countries. Climatic change could result in increasing numbers of environmental refugees with associated increases of ill-health, disease and death among them.

37. Climate change has such important implications for the sustainability of development that policy responses, and the commitment of financial and other resources, are justified for that reason alone. Some economic policies can distort markets so they harm the environment and contribute to global warming and sea-level rise. There is an imperative need for development policies that not only reduce global warming trends but also increase economic and social resilience.

38. While increasing forest cover can contribute to the slowing of global climate change, this is not the major cure of the problem. Five priority areas can be identified: (1) assessment of national opportunities for biomass-based carbon sinks; (2) optimal biomass management; (3) accelerated research and (4) monitoring systems; and (5) supporting the development of an international instrument on conservation and development of the world's forests linked with climate and biodiversity conventions.

39. Developing countries are being asked to participate in the alleviation of the legacy of environmental damage from prior industrialization. If they are to avoid the potentially disastrous course followed by industrialized countries in the past, they need to adopt modern technologies early in the process of development, particularly in regard to energy efficiency. Developing countries must not go through the evolutionary process of previous industrialization but rather, must "leapfrog" ahead directly from a status of underdevelopment through to efficient, environmentally benign, technologies.

40. A massive and sustained flow of scientific and technological expertise towards the development of the intellectual resources, technical and institutional capacity of the developing countries is a necessary complement to the efforts of those countries.

41. Furthermore, co-ordinated international activities and policy development is needed for:

- (a) Global measurement and research efforts through WCP, IGBP, and other related international programmes;

(b) Assessment of functions of a continuing IPCC to support negotiation of and providing technical input to a convention;

(c) Development of a Convention on Climate Change.

Summary of the Ministerial Declaration of the SWCC

42. The Ministers recognized climate change as a common concern of mankind, and committed themselves to take active and constructive steps without further delay. Recognizing further that the principle of equity and the common but differentiated responsibility of countries should be the basis of any global response to climate change, developed countries must take the lead to reduce global net emissions, and enter into and strengthen co-operation with developing countries to enable them to adequately address climate change without hindering their national development goals and objectives. There is a need to meet the requirements of developing countries, that adequate and additional financial resources be mobilized and the best available environmentally-sound technologies be transferred expeditiously on a fair and most favourable basis.

43. There is need to strengthen research on climate mechanisms, climate change and sea-level rise, such as undertaken by the World Climate Research Programme and the International Biosphere-Geosphere Programme, in order to reduce uncertainties in predictions of regional as well as global climate change; to identify yet unknown climate-related issues; to design sound response strategies; and to intensify research on the social and economic implications of climate change and response strategies.

44. In order to achieve sustainable development, precautionary measures to meet the climate challenge must anticipate, prevent, attack, or minimize the causes of, and mitigate the adverse consequences of, environmental degradation that might result from climate change. The potentially serious consequences of climate change give sufficient reasons to begin by adopting response strategies even in the face of significant uncertainties.

45. The ultimate global objective should be to stabilize greenhouse gas concentrations at a level that would prevent dangerous anthropogenic interference with climate. As a first step, emissions of greenhouse gases not controlled by the Montreal Protocol on Substances that Deplete the Ozone Layer need to be stabilized. Contributions should be equitably differentiated according to countries' responsibilities and their level of development.

STABILIZATION OF ATMOSPHERIC CONCENTRATIONS

Reductions in the human-made emissions of greenhouse gases required to stabilize concentrations at present-day levels.

Carbon Dioxide	<60%
Methane	15-20%
Nitrous Oxide	70-80%
CFC-11	70-75%
CFC-12	75-85%
HCFC-22	40-50%

Note that stabilization of each of these gases would have different effects on climate.

Source: IPCC First Assessment Report, Working Group I.

46. All developed countries should establish targets and/or feasible national programmes or strategies to limit emissions of greenhouse gases by the time of the 1992 United Nations Conference on Environment and Development.

47. Developing countries have as their main priority alleviating poverty and achieving social and economic development. Their net emissions must grow from their, as yet, relatively low energy consumption to accommodate their developing needs. Narrowing the gap between the developed and the developing world would provide a basis for full partnership of all nations and would assist the developing countries in dealing with the climate change issue. To enable developing countries to meet incremental costs required to take the necessary measures, adequate and additional financial resources should be mobilized and best available environmentally-sound technologies transferred expeditiously on a fair and most favourable basis.

48. Consideration should be given to the need for funding facilities, including the proposed World Bank/UNEP/UNDP Global Environmental Facility, a clearing-house mechanism and a new possible international fund composed of adequate additional and timely financial resources and institutional arrangements for developing countries. Such funding should be related to the implementation of the framework convention on climate change and any other related instruments that might be agreed upon. In the meantime, developed countries are urged to co-operate with developing countries to support immediate action in addressing climate change including sea-level rise without imposing any new conditionality on developing countries.

49. Financial resources channelled to developing countries should, inter alia, be directed to:

(a) Promoting efficient use of energy, development of lower and non-greenhouse gas emitting energy technologies;

(b) Arranging transfer of the best available environmentally-sound technology on a fair and most favourable basis, and promoting their development;

(c) Co-operating with them to enable their full participation in international meetings on climate change;

(d) Enhancing observational networks, to facilitate research, monitoring and assessment;

(e) Rational forest management practices and agricultural techniques which reduce greenhouse gas emissions, and increase sinks;

(f) Enhancing their capacity to develop various programmes to address climate change.

50. Promotion of energy efficiency is the most cost-effective immediate measure. Transport energy use should attract special attention in many countries.

51. There is no single quick-fix technological option for limiting greenhouse gas emissions. However technological innovation as well as individual and social behaviours and institutional adaptations are key elements of any long-term strategy that deals with climate change in a way that meets the goal of sustainable development. Therefore, countries should intensify their efforts in technological research, development and dissemination of appropriate and environmentally-sound technologies, and take effective measures to remove barriers to their dissemination.

52. The protection and management of forest ecosystems must be well co-ordinated and preferably compatible with other possible types of action related to reduction of emission of greenhouse gases, rational utilization of biological resources, provision of financial resources, and the need for more favourable market conditions for forest products.

53. The particular problems and needs of low-lying coastal and small vulnerable island countries, some of whose very existence is placed at risk by the consequences of climate change, needs also to be addressed.

54. Appropriate precautionary and control measures need to be developed and implemented at regional and national levels, to counter the increasing degradation of land, water, genetic and other productive resource bases by drought, desertification and land degradation.

55. Negotiations on a framework convention on climate change should begin without delay after the forty-fifth session of the General Assembly. It is highly desirable that an effective framework convention, containing appropriate commitments, and any related instruments, be signed at the 1992 United Nations Conference on Environment and Development.

V. GENERAL ASSEMBLY RESOLUTION 45/212

56. The United Nations General Assembly, at its forty-fifth session has decided to establish a single intergovernmental negotiating process under the auspices of the General Assembly, supported by the United Nations Environment Programme and the World Meteorological Organization, for the preparation by an Intergovernmental Negotiating Committee of an effective framework convention on climate change, containing appropriate commitments, and any related instruments as might be agreed upon.

57. The Intergovernmental Negotiating Committee will be served by an *ad hoc* Secretariat in Geneva, to be established by the Secretary-General of the United Nations, in co-operation with the United Nations Environment Programme and the World Meteorological Organization.

58. The first negotiating meeting will take place in Washington, D.C., United States of America, in February 1991. Further meetings will be scheduled, taking into account, among other issues, the timing of the meetings of the UNCED Preparatory Committee.

59. The General Assembly, requested the Intergovernmental Negotiating Committee to keep the UNCED Preparatory Committee informed, on a regular basis, of the progress of the negotiations, including by preparing a final report on the negotiations for the 1992 United Nations Conference on Environment and Development.

60. The General Assembly further requested the Intergovernmental Negotiating Committee to take into account relevant developments in the preparations for the United Nations Conference on Environment and Development, that the Preparatory Committee may bring to its attention.

VI. MAJOR ENVIRONMENT DEVELOPMENT ISSUES FOR CONSIDERATION BY THE UNCED PREPARATORY COMMITTEE

61. With the decision 45/212 of the United Nations General Assembly, the intergovernmental negotiating process to formulate a framework convention on climate change is now in place, as a process running parallel to the activities of the UNCED Preparatory Committee. The mandate of the Intergovernmental Negotiating Committee is to develop the framework convention and possible protocols.

62. The mandate of the UNCED Preparatory Committee, on the other hand is to consider, among other issues, the problem of climate change, and to propose appropriate response strategies for the world community, taking into consideration the development dimension, and the cross-sectoral linkages on the agenda of the 1992 Conference, especially those of technology development and transfer, financial requirements, modalities of new funding, and the related institutional and legal issues. These two issues are closely related and complementary and must be the subject of close and continuing consultation and co-ordination.

63. In this regard, the Preparatory Committee is expected to formulate a set of actions and programmes as part of the proposed Agenda-21 in response to the problem of climate change, which will support any potential climate change convention to be opened for signature at the 1992 Conference. Furthermore, this set of actions and programmes must reflect environmental as well as developmental concerns, and must be directed to all the main issues raised in General Assembly resolution 44/228. In the development of these actions and programmes, the Preparatory Committee will need to give special emphasis on the cross-sectoral objectives of the 1992 Conference, as defined in the same resolution 44/228, such as, in particular, objectives of technology transfer, institutional framework and sources and modalities of finance.

64. Taking the above, as well as the present state of knowledge on the question of climate change into account, possible elements of such a set of actions and programmes, to be considered by the Preparatory Committee could include the following:

Setting Objectives/Targets

65. The Second World Climate Conference has urged countries to make assessments of their greenhouse gas emissions and sinks, and consequently by the time of the 1992 Conference develop targets to stabilize and reduce these emissions, and prepare national programmes to reach these targets. In the developing countries, this needs to be carried out in a way that does not hinder their development objectives. These could be reported, to the extent that they are available by that time, in the national reports being prepared for the 1992 Conference.

66. While setting of objectives and targets can be done by countries on a unilateral basis, these will have to be co-ordinated, and depending on the outcome of the negotiations, perhaps agreed upon at regional and global levels. This will have to consider different ways of calculating and accounting for greenhouse gas emissions, such as per capita, per land area, present or cumulative, etc. Comprehensive greenhouse gas accounting tools, such as the one developed by the Stockholm Environment Institute will need to be used.

67. Methodologies to monitor, assess and account for these greenhouse gas emissions and sinks are not widely available, particularly in the developing countries. In some instances, particularly with respect to biospheric sources and sinks, considerable research will be required before uncertainties are reduced to a satisfactory degree. Such research will frequently have to be organized on an international basis, for example through the IGBP. It will also require considerable transfer of relevant monitoring and related technologies, as well as know-how to, and training of experts in developing countries.

Energy Efficiency/Supply

68. Rational use and production of energy, and in particular energy efficiency measures have been identified as the most important technology options to contribute to rapid CO₂ emission reductions worldwide. Recognizing the major differences between industrialized and developing countries in this regard, a comprehensive global energy strategy needs to be developed by the time of the 1992 Conference, to support a potential protocol on energy-related issues to the framework convention on climate change. This strategy could include the following:

(a) Assessment of concrete energy efficiency potentials in countries, and consequently setting national, and where possible sectoral targets on energy efficiency increases, in order to contribute to a global energy efficiency increase of approximately 2 per cent per year;

(b) Assessment of additional energy needs which will be required for economic development, particularly in the developing countries, and the development of options which can provide for these needs using the most efficient and most environmentally-sound technologies, with particular emphasis on New and Renewable Energy Sources (NRSE), as well as on advanced fossil-fuel conversion systems;

(c) Concerted programmes to assist, particularly the developing countries, in developing technologies and training human resources;

(d) Concerted international programmes to make available, on a preferential basis, especially to developing countries, environmentally-sound, efficient energy production and end-use technologies, and related information.

Transport

69. The transport sector in many countries is one of the most important sources of carbon dioxide emissions, and indeed other pollutants. Concerted efforts to increase the efficiency of automobile fleets; increase the shares of public versus private transport; as well as general efforts to plan human settlements in ways which would result in lower overall greenhouse gas emissions should be central to national, regional and global programmes to reduce climate change.

Biomass Sinks

70. Increasing forest cover can contribute to carbon sequestration from the atmosphere, yet increasing forest cover simply to slow down climate change is not the major cure for the problem, even if the ambitious Noordwijk targets for a net reforestation rate of 12 million hectares per year are achieved. Increasing the organic content of soils in many countries can also act as substantial carbon sinks over a much wider area than is possible through afforestation. An important priority in most areas, however, is to reduce

present deforestation, land degradation, and soil loss rates as soon as possible. The Preparatory Committee may wish to consider the following potential actions in this area:

(a) Assessment of national opportunities for biomass-based carbon sinks, such as by increasing forest and grassland cover, increasing organic content of soils, or other means;

(b) Promotion of sustainable biomass management and land use policies, taking into account development needs, as well as environmental constraints and opportunities, including issues of biological diversity;

(c) The above actions will need to be supported by increased research, and improved capabilities, especially in the developing countries, to monitor and assess the related resources;

(d) Integrating the above considerations into the ongoing negotiations related to the climate, biodiversity, and possible forestry conventions.

Adaptation Strategies

71. The world is already committed to a certain level of climate change, even if greenhouse gas emissions were immediately halted. Furthermore, due to the delaying effect of the oceans, some of the changes being caused today will appear later. While pursuing vigorously various limitation strategies, countries must start to develop programmes to adapt to changed climate.

72. Climate change, while itself causing a number of negative impacts, will exacerbate some existing problems of land degradation, climate variability, water availability, and insufficient subsistence food production. Particularly affected will be the already vulnerable individuals, countries and regions. This is especially a problem for low-lying island States and coastal areas, and arid regions.

73. A fundamental requirement to be able to develop national or regional adaptation strategies is to have access to reliable climate predictions at the regional and local levels, especially since climate change will be very non-uniform. Some regions will experience considerably greater changes than others. Considerable advances in scientific knowledge, monitoring and assessment will be necessary to achieve this. Furthermore, it is also important to estimate reliably the potential costs (and benefits, where applicable) of climate change, including if no actions are taken, and when specific limitation and adaptive strategies are introduced. While in a number of industrialized countries studies to analyse these costs are under way, this is not the case for all countries. Countries should be helped to undertake such studies, and their results should be put together in regional and global frameworks. (Refer to UNCED paper A/CONF.151/PC/23 also.)

74. Given the particular impacts of climate change on low-lying coastal areas and island States, coastal area management, including considerations of climate impacts, will need to be a special priority.

Technology

75. The development and the transfer of efficient and environmentally-sound energy production and end-use technologies, as well as policy and institutional frameworks to promote them, will be crucial elements in the energy strategies which need to be implemented, both to support the development process, and to support greenhouse gas reduction strategies worldwide.

Finance

76. The various programmes which will need to be put in place, including for technology development, technology transfer, will cost money. These costs should be assessed, as part of the "costing exercise" referred to above.

77. In order to cover these incremental costs, especially to developing countries, new sources of funding and funding modalities may need to be considered. These may be linked to the specific protocols of the framework convention on climate change. Existing efforts, such as the IBRD/UNEP/UNDP Global Environmental Facility may need to be strengthened and supplemented by others.

VII. RECOMMENDATIONS ON THE NEGOTIATING PROCESS

78. The actions and programmes developed as part of the UNCED preparatory process will provide for co-operative actions on a voluntary basis in many of the same areas that will ultimately be covered by mandatory provisions of a convention and/or its protocols. The First Assessment Report of the IPCC and the Reports of the SWCC provide a sound basis for this. Development of an agenda for such programmes and activities and their implementation on a voluntary basis will therefore make an important contribution to the negotiating process and help to establish the framework and basis for implementation of measures included in the convention/protocols when they come into force.

79. It is of the utmost importance therefore that the Preparatory Committee be fully informed concerning the progress of negotiations, that it be represented at meetings of the Intergovernmental Negotiating Committee and that the UNCED Secretariat participate actively in negotiating meetings and related activities and work closely with the ad hoc Secretariat being established in Geneva to support the negotiating process.

80. The UNCED Secretariat has prepared a short document (presented on behalf of the Secretary-General of UNCED at the first negotiating meeting, to be held in Washington, D.C., in February 1991) on its activities and plans on climate related issues for the 1992 Conference. The document is available as an addendum to this report.

81. An important responsibility of the Preparatory Committee in respect to the negotiating process will be to ensure that it fully takes into account and incorporates satisfactory provision for the cross-sectoral linkages and development dimensions of the issues that are subject to negotiation. The following are some examples of important areas in which these cross-sectoral linkages and development dimensions will need especially to be taken into account:

Cross-sectoral linkages

- Agriculture
- Oceans
- Forest
- Biodiversity

Development Dimension

- Need for Energy for Development, which is "GHG-friendly"
- Need for Forestry and Land-use Policies which respect development needs, and are "GHG-friendly"

82. It will be especially important for the UNCED Preparatory Committee to bring to the attention of the Intergovernmental Negotiating Committee issues arising from its work that it deems relevant to the Convention negotiations, particularly as they relate to the integration of the developmental and cross-sectoral objectives identified in General Assembly resolution 44/228, and, in particular, in paragraph 8 of the resolution adopted by the Preparatory Committee at its organizational session.

83. In light of the prospect of negotiations beginning in respect of a convention on biodiversity and the possibility of negotiations in respect of a global forestry convention and the close relationship that exists between these two areas and the proposal for inclusion of a forestry protocol in the convention on climate change, it will be especially important to ensure close co-ordination and interaction as between these negotiating processes. Given that each of them will also be directly relevant to the preparations for UNCED, its Preparatory Committee and Secretariat may be expected to take an active and leading role in facilitating such co-ordination and interaction.
